

ELECTRICAL WIRE DISPENSING DEVICE AND PACKAGE

Field of the Invention

The present invention is directed to a device for shipping/distributing coiled wire and cable as well as dispensing coiled wire and cable. It is specifically directed to a disposable or recyclable self-contained device that wire manufacturers can use as a shipping and distribution container for coiled wire and cable products as well as a device that contractors can use for dispensing wire or cable which precludes kinking of the wire or cable as it is dispensed.

Background of the Invention

Electrical wire commonly used in the residential and commercial construction industry is generally manufactured in coils of predetermined lengths and diameters. The individual coils of wire are typically shipped and sold to contractors in boxes or as a roll in plastic-wrap material. In order to use the electrical wire, the contractor must pull the wire from its shipping box or uncoil the wire from its roll configuration once the plastic-wrap is removed. Even though the box which the coil of electrical wire is shipped in will often contain access holes, when the electrical wire is pulled from its box it will often become kinked or knotted which in turn requires the contractor to temporarily discontinue installation of the wire in order to remove the kinks or knots from the electrical wire. Where the manufacturer/distributor packages the coil of electrical wire in plastic-wrap material, kinking or knotting becomes even more problematic.

U.S. Patent No. 3,729,092 is directed to a portable support on which coiled electrical wire can be placed and then hung to permit the wire to be pulled and unwound from the support base for use. The '092 invention does not provide a means for a wire manufacturer to distribute its product, nor does the '092 invention employ a means for

preventing the base from continuously rotating once the user discontinues pulling wire from the device, and thus dispensing wire unnecessarily.

U.S. Patent No. 3,974,980 is directed to a wire reel for dispensing the electrical wire from its cardboard box or its coiled form. Similar to the invention of the '092 patent, the invention of the '980 patent utilizes a base support for the electrical wire and a means for suspending the device when in use. The '980 invention employs a guide/leader loop through which the electrical wire is pulled as it is uncoiled from the dispensing device for installation as well as a braking system to retard unwanted rotation of the device to prevent uncoiling. The '980 device is constructed of numerous parts which may require adjustment or become lost, thus adding to its complexity for use and in the manufacturing of the device. Also, the '980 invention does not provide a simple means for a wire manufacturer to distribute its coiled wire to contractors.

U.S. Patent No. 4,973,011 is directed to a device that allows the unwinding of coiled wire from the cardboard box in which it is packaged for sale and distribution. Similar to the above referenced '092 and '980 patents, the '011 patent employs a base support for the coiled wire. The '011 patent is functionally similar to the devices of the '092 and '980 patents in that all utilize a means to hang the devices during use. However, the '011 patent is limited to wire coils that are packaged in cardboard boxes, and therefore not capable of serving as both a shipping container and wire dispenser.

Summary of the Invention

As has been shown by the prior art, eliminating the kinking or knotting of electrical wire during installation advantageously decreases both the time and costs of installation. However, additional savings can be realized by the contractor if the electrical wire shipping container can also be used to dispense the electrical wire thereby eliminating the need to purchase additional equipment for installation.

The present invention is an easy to use device consisting of relatively few parts, which serves the dual purpose of a shipping container for wire manufacturers, and a wire dispensing device to be used by contractors when installing the wire. The multi-

functional aspect of a simple and portable device for shipping and dispensing wire, which is readily disposable or recyclable, distinguishes the subject device from the prior art.

Thus, in accordance with the present invention the electrical wire remains within the device during use by the contractor and for transporting the electrical wire from work site to work site. Another important aspect of the present invention is its ease of use and portability. The present invention has relatively few parts, none of which need to be adjusted before or during use. Additionally, the small size of the device and the mechanism by which it is secured to an overhead beam or pipe insures that the present invention will be easily repositioned at the work site and easily transported from work site to work site. Finally, since the device is manufactured from materials that are both commonplace and economical, once the supply of electrical wire is completely consumed by the contractor the device may simply be discarded or disposed of at an appropriate recycling center.

Accordingly, the present invention is directed to a wire dispensing device having a flat, rigid base for supporting a coil of wire, the coil having an inner diameter, an outer diameter, and a height, the base defining an inner region and an outer perimeter greater than the outer diameter of the coil, the outer perimeter defining an outer wall extending outwardly therefrom and having a height at least equal to the height of the coil, and support lines connected to and extending from the inner region of the base and converging to a rotatable hanging means. Preferably, the wire dispensing device is circular in shape. Preferably, the inner region defines a center compartment for stowage of the support lines and the hanging means. Most preferably, the inner region of the base has an inner wall extending upwardly from the base, which is, most preferably, circular and concentric with the outer wall, and which has a diameter less than the inner diameter of the coil. Preferably, an upper ridge extends inwardly from the upper surface of the inner wall, parallel to the base. In a preferred embodiment the support lines are connected to and extend from the upper ridge. Alternatively, the support lines are connected to and extend from the inner wall. While the support lines may be formed of any suitable material such as metal chain, in the preferred disposable/recyclable embodiment of the present invention they are formed of polymeric rope.

In another aspect the present invention is directed to a package for distributing and dispensing a coil of wire, which has a flat, rigid base for supporting a coil of wire, the coil having an inner diameter, an outer diameter, and a height, the base defining an outer perimeter greater than the outer diameter of the coil and an inner region, support lines connected to and extending from the inner region of the base and converging to a rotatable hanging means, wherein the inner region of the base forms a center compartment for stowage of the support lines and hanging means, and an outer covering, which may be, for example, plastic sheeting material, a box or a strap.

Thus, preferably the base of the device is circular in shape with a raised outer wall and a raised inner wall. The upper edge of the inner wall terminates in a flat ridge parallel to the base of the device and creates a center compartment within the base. The base is suspended by lines of polymeric rope or metal chains of equal length. The support lines extend upwardly and are symmetrically spaced around the flat ridge of the inner wall, with one end of each line being attached to the flat ridge of the inner wall on the base and its opposite end being attached to a swivel hook assembly. The support lines with swivel hook assembly are stored within the center compartment during shipping and for transportation between work sites. For use the support chains are extended upward from the center compartment of the support base and the device is attached to an overhead beam or pipe by means of the swivel hook assembly. The swivel hook assembly provides the means for suspending the device from and attaching the device to an overhead beam or pipe during use and simultaneously permits the base to freely rotate as wire is dispensed from the device. The free end of the electrical wire is pulled over the outer wall of the base to the desired length. The contact between the electrical wire and the upper edge of the outer wall prevents continued rotation of the device when the contractor discontinues pulling electrical wire from the device. In an alternative embodiment, the free end of the electrical wire is fed through a guide loop, which prevents over feeding of the wire.

Another alternative embodiment of the present invention eliminates certain structures of the device, which may simplify and reduce manufacturing costs. In the alternative embodiment of the device, the inner wall and its associated flat ridge are removed, thereby creating a circular center opening having a diameter less than the inner

diameter of the coiled electrical wire. The support lines of the alternative embodiment are symmetrically spaced and attached to the perimeter of the circular center opening. All the remaining components of the device remain the same and function as previously described.

Brief Description of the Drawings

FIG. 1 is a perspective view showing a coil of electrical wire on the assembled device in preparation for use;

FIG. 2 is an enlarged vertical view of the swivel hook assembly with attached support lines;

FIG. 2A is a cross-sectional view of a portion of the swivel hook assembly of FIG. 2, specifically the independently relatable extended lip bearing a guide loop line;

FIG. 2B is a cross-sectional view of a portion of the swivel hook assembly of FIG. 2, specifically the independently ratable sleeve bearing the support lines;

FIG 2C is a cross-sectional view of a portion of the swivel hook assembly of FIG. 2, specifically the assembly pin;

FIG. 3 is a perspective view of the circular base showing the outer wall, the inner wall with its raised flat ridge for attaching support lines, and center compartment created by the inner wall;

FIG. 4 is an enlarged vertical view of the knotted means for attaching a support line to the support base of the device;

FIG. 4A is an enlarged vertical view of an alternative, eye-bolt means for attaching a support line to the support base of the device;

FIG. 5 is a vertical view showing a full coil of electrical wire with a length being dispensed and engaging the outer wall of the device;

FIG. 6 is a vertical view showing a partial coil of electrical wire with a length being dispensed and engaging the outer wall of the device;

FIG. 7 is a perspective view of an alternative embodiment of the device including a separator plate;

FIG. 8 is an enlarged vertical view of the swivel hook assembly of the device of FIG. 9;

FIG. 9 is a perspective view of an alternative embodiment of the device showing a coil of electrical wire and support lines extending upward from the inner region of the device; and

FIG. 10 is a perspective view showing an alternative embodiment of the device showing the attachment of the support lines to the inner region of the device.

Detailed Description of the Preferred Embodiments

The present invention is directed to a device that serves as a package for a coil of electrical wire and also as a device for dispensing electrical wire which prevents the unwanted knotting or kinking during installation. In the most preferred embodiment, the present device is formed of lightweight, polymeric components which may be discarded but which preferably are recyclable.

As can be ascertained in Figure 1, the device 10 is comprised of relatively few components. The circular base of the device as shown in Figure 3 can be manufactured from any economical, lightweight, rigid material, preferably a recyclable plastic. The circular base 2 is comprised of an outer wall 6, a flat base 13, an inner wall 11 with an upper flat ridge 7 that is parallel to the flat base 13, and a circular center compartment 8 formed by the raised inner wall 11. The diameters of the outer wall 6 and the inner wall 11 either accommodate or exceed the outside and inside diameters of the coil of electrical wire 1 (see Figures 5 and 6) thereby permitting the wire manufacturer to use the device as a shipping/distribution container. The support lines 3, being constructed of a suitable stiff polymeric rope material, are symmetrically attached 12 to the flat ridge of the inner wall by means such as knotting 15, shown in Figure 4, or eye-bolts 17 through which the lines are knotted or rings 19 are attached, shown in Figure 4A. The opposite ends of the support lines 3 are attached to a swivel hook assembly 5 as can be seen in Figures 1 and 2.

As shown in Figure 2, the swivel hook assembly is comprised of a hook 20, and a downwardly extending assembly portion 22. Downwardly extending assembly portion

22 includes downwardly extending shaft 24 (not visible in Figure 2, but indicated in cross-section in Figures 2A – 2C). Independently rotatable sleeve 26, which bears the support lines 3, is carried on and rotates about shaft 24. As shown in Figure 2, rings 28 attach the support lines to rotatable sleeve 26. However, any other suitable means, including simple knotting means, may be employed. Thus, rotatable sleeve may include spaced holes, which receive the support lines, as shown in Figure 2B, or downwardly extending hooks or eyes to which the support lines may be attached. Regardless of the means for attaching the lines to the rotatable sleeve, preferably they are symmetrically spaced, both to the swivel hook assembly and to the base of the device. At least three, preferably at least four support lines are employed. All are of equal length. Lowermost sleeve 30, through which extends locking pin 32, secures the lower assembly components onto shaft 24.

The embodiment of Figures 1 and 2 includes a guide line 40 for controlling the amount of electrical wire dispensed. If it is employed, guide line 40 is attached to the swivel hook assembly as is shown in Figure 2. Specifically, for such embodiment the downwardly extending assembly portion 22 of the swivel hook assembly includes independently rotatable extended lip 34 to which the guide line is attached by means such as ring 36, shown in Figure 2, or other appropriate means such as simple knotting means. Independently rotatable extended lip 34, shown in cross-section in Figure 2A, rotates about shaft 24 in a manner similar to, but independent from, the rotation of sleeve 26. In order for the guide line 40 to be outboard of the support lines 3, extended lip 34 must be above sleeve 26. Guide line 40 includes loop 42 at its terminal end.

During operation the electrical wire is fed through loop 42. When the user pulls the wire, loop 42 prevents an undesirable excess of electrical wire from being dispensed. It should be noted that guide line 40, loop 42, and extended lip 34 are optional components of the present device. Generally, frictional engagement of the electrical wire as it is pulled past or over outer wall 6 provides sufficient braking action to control and preclude overfeeding of the wire. See, specifically, Figures 5 and 6.

Figure 7 illustrates an alternative embodiment 10' of the present invention, which includes alternative swivel hook assembly 50, shown in an enlarged view in Figure 8. Swivel hook assembly 50 includes a D-ring 52 rotatably connected to the base of a clasp-

type hook 54. It should be noted that the hook 20 of swivel hook assembly 5 may be employed in place of clasp-type hook 54 and a clasp-type hook may be used in place of hook 20 in the swivel hook assembly of Figures 1 and 2. Support lines 60 are carried by D-ring 52 by means of rings 62, shown, or by any other suitable means. As above, at least three, preferably at least four support lines are employed. As shown in Figures 7 and 8 support lines 60 are of a chain configuration. Any suitable type of line may be employed including metal or polymeric chain, rope, or cable. However, for the preferred embodiment of the present invention in which the device is disposable or recyclable, lightweight, polymeric components are preferred. Thus, if the support lines are formed of a lightweight material and a swivel hook assembly such as shown in Figures 7 and 8 is employed, spacer 64 is required. Specifically, it has been found in accordance with the present invention that lightweight support lines will become entangled during operation of the device without some separating means. For the swivel hook assembly shown in Figures 1 and 2, rotatable sleeve 26 serves to preclude entanglement of the lines. For the more simple swivel hook assembly of Figures 7 and 8, spacer 64 is required. Spacer 64 may include spaced holes 66 through which the support lines run, as shown in Figure 7, or spaced notches which receive the lines. As above, it is preferred that the support lines are symmetrically spaced, both at the spacer and at the base.

Figures 9 and 10 illustrate yet a further embodiment 90 of the present invention. In this embodiment the inner wall is missing and the support lines 91 are attached directly to the floor 93 by any suitable means. Outer wall 96 provides a braking action upon frictional engagement of the electrical wire as it is drawn from the device. As shown in Figure 9 neither a rotatable spacer neither sleeve nor a spacer are provided. Accordingly, this represents a less preferred embodiment in which the device components, specifically the support lines are formed of a durable, heavy material rather than a lightweight, disposable or recyclable material. That is, although the present invention preferably is directed to a lightweight, disposable or recyclable device, some of the features of the present invention may be employed advantageously in a more long-lived device. Such device, which would be formed of, for example, machined metal, metal chain support lines, and a durable metal swivel hook assembly, likewise would benefit from the raised outer wall defined at the outer perimeter of the base and would, therefore, be within the

scope of the present invention. Thus, all of the structural features of the present invention may be employed either in the preferred disposable or recyclable embodiment or in the alternative durable embodiment. The only caveat is that for the lightweight, disposable or recyclable embodiment, some means must be provided for precluding entanglement of the lightweight support lines. Such is not required for the heavier, more durable embodiment. Thus, for example, although Figures 9 and 10 represent a heavyweight device, as is evidenced by the lack of a spacer or spacing sleeve on the swivel hook assembly, a disposable device may omit the inner wall as is shown in those Figures. For such embodiment the swivel hook assembly and support lines may be contained in the opening formed by the inner diameter of the coil of electrical wire during packaging, such as by plastic overwrap.

Thus, for shipping and distribution the present inventive device is wrapped in a protective covering, such as plastic wrap or other suitable material, to keep the coil of electrical wire 1 properly positioned within the outer wall and the inner wall, if one is employed, and to keep the support lines and the swivel hook assembly inside the center compartment, if one is present, or, if not, inside the inner diameter of the electrical wire coil. To use the device the protective covering is removed and the support lines are pulled upward. The device is suspended from an overhead beam or pipe by means of the swivel hook assembly. As the free end of the electrical wire 1 is pulled outward and over the outer wall of the device to the desired length, the device rotates by means of the swivel hook assembly. When the contractor discontinues pulling the electrical wire 1 from the device, the contact between the electrical wire 1 and the guide line loop or, more preferably, the upper edge of the outer wall, frictionally prevents continued rotation of the device and the unnecessary release/uncoiling of additional electrical wire.

The foregoing description in the present invention has been presented for purposes of illustration and description. Furthermore, the description is not intended to limit the invention to the form disclosed herein. Consequently, variations and modifications commensurate with the above teachings, in the skill or knowledge of the relevant art are within the scope of the present invention. The embodiments described herein are further intended to explain the best modes known for practicing the invention and to enable others skilled in the art to utilize the invention in such, or other,

embodiments and with various modifications required by the particular applications or uses of the present invention. It is intended that the appended claims be construed to include alternative embodiments to the extent permitted by the prior art.